AMENDMENTS TO THE CLAIMS

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

Listing of Claims:

1. (Currently Amended) An apparatus for calculating an azimuth angle, comprising:

a two-axis earth magnetic sensor, which is mounted on a device that requires azimuth information, for measuring a strength of an earth magnetic field according to the azimuth information if the device moves;

an inclinometer for calculating an attitude such as a roll angle and a pitch angle;

a signal conditioning unit including an analog-to-digital (A/D) converter for converting sensor data into a digital value; and

a microprocessor for calculating the azimuth information by compensating for an attitude error using outputs of the two-axis earth magnetic sensor and the inclinometer, the microprocessor including a virtual Z-axis earth magnetic data generation part for generating virtual Z-axis earth magnetic data based on the outputs of the two-axis magnetic sensor and the inclinometer[[;]]

~~a serial communication interface for transmitting the data processed by the microprocessor; and~~

~~an LCD module for displaying the azimuth information calculated by the microprocessor~~.

2. (Original) The apparatus for calculating an azimuth angle as claimed in claim 1, wherein the two-axis earth magnetic sensor is either a fluxgate sensor or a magnetoresistive (MR).

3. (Original) The apparatus for calculating an azimuth angle as claimed in claim 1, wherein the inclinometer is an accelerometer.

4. (Original) The apparatus for calculating an azimuth angle as claimed in claim 1, wherein the signal condition unit further comprises:

a low-pass filter for removing a power supply noise and a high-frequency noise.

5. (Currently Amended) The apparatus for calculating an azimuth angle as claimed in claim 1, wherein the microprocessor comprises:

a register for storing the sensor ~~signal outputted~~ data output from the signal conditioning unit; and

an Arithmetic Logic Unit (ALU) and an Floating Point Unit (FPU) for compensating for the attitude error of the earth magnetic sensor and for calculating the azimuth angle~~; and~~

~~an internal timer for setting a data output period for transmitting the sensor data and the calculated azimuth angle to the LCD module~~.

6. (Currently Amended) A method of calculating an azimuth angle, comprising:

~~setting a data output period using an internal timer mounted on a microprocessor;~~

converting an analog value sensed by a sensor into a digital value using an analog-to-digital converter;

storing the converted sensor data in an internal register of the microprocessor;

calculating an attitude and obtaining a coordinate conversion matrix using data obtained from an inclinometer;

generating a virtual Z-axis earth magnetic data using a two-axis earth magnetic sensor;

calculating earth magnetic data on a horizontal coordinate system using three-axis earth magnetic data, wherein the three-axis earth magnetic data includes a combination of the two-axis earth magnetic sensor data and the one-axis virtual sensor data, and a coordinate conversion matrix; and

calculating the azimuth angle using the calculated earth magnetic data~~; and~~

~~if a timer interrupt is generated due to the output period set in the internal timer, transmitting the sensor data and the calculated azimuth angle to an external system through a serial communication interface and displaying the sensor data and the calculated azimuth angle on an LCD module~~.

7. (Original) The method as claimed in claim 6, wherein generating the virtual Z-axis earth magnetic data comprises:

measuring by experiment a strength of an earth magnetic field measured when a measurement axis of the earth magnetic sensor points in a vertically downward direction toward the earth;

calculating the attitude using an output of the inclinometer;

measuring a strength of the earth magnetic field sensed in an X-axis direction and a Y-axis direction of a sensor module using the two-axis earth magnetic sensor; and

generating the virtual Z-axis earth magnetic data using the calculated attitude of the sensor module and an output value of the two-axis earth magnetic sensor.

8. (Original) The method as claimed in claim 7, wherein calculating the earth magnetic data on the horizontal coordinate system comprises:

calculating the coordinate conversion matrix using the attitude calculated using an output of the inclinometer; and

calculating the earth magnetic data of the horizontal coordinate system by multiplying the generated virtual Z-axis earth magnetic data and the measured X-axis and Y-axis earth magnetic data by the calculated coordinate conversion matrix.

9. (Original) The method as claimed in claim 8, wherein calculating the azimuth angle using the two-axis earth magnetic sensor comprises:

calculating the attitude using the inclinometer and obtaining the coordinate conversion matrix;

generating the virtual Z-axis earth magnetic data;

generating the earth magnetic data on the horizontal coordinate system; and

calculating the azimuth angle using X-axis and Y-axis data of the earth magnetic data on the horizontal coordinate system.

10. (New) The method as claimed in claim 6, further comprising setting a data output period using an internal timer mounted on a microprocessor, prior to converting the analog value sensed by the sensor into the digital value.

11. (New) The method as claimed in claim 10, further comprising, if a timer interrupt is generated due to the output period set in the internal timer, transmitting the sensor data and the calculated azimuth angle to an external system through a serial communication interface and displaying the sensor data and the calculated azimuth angle on an LCD module.

12. (New) The apparatus for calculating an azimuth angle as claimed in claim 1, further comprising a serial communication interface for transmitting the sensor data and the azimuth information.

13. (New) The apparatus for calculating an azimuth angle as claimed in claim 1, further comprising an LCD module for displaying the azimuth information.

14. (New) The apparatus for calculating an azimuth angle as claimed in claim 13, further comprising an internal timer for setting a data output period for transmitting the sensor data and the calculated azimuth angle to the LCD module.

15. (New) A method of calculating an azimuth angle, comprising:

measuring a strength of an earth magnetic field according to azimuth information using a two-axis earth magnetic sensor mounted on a device that requires azimuth information, if the device moves;

calculating an attitude using an inclinometer;

converting sensor data into a digital value; and

calculating the azimuth information by compensating for an attitude error using outputs of the two-axis earth magnetic sensor and the inclinometer, the calculating including generating virtual Z-axis earth magnetic data based on the outputs of the two-axis magnetic sensor and the inclinometer.

16. (New) The method of calculating an azimuth angle as claimed in 15, wherein converting sensor data into the digital value comprises using a signal conditioning unit including an analog-to-digital (A/D) converter.

17. (New) The method of calculating an azimuth angle as claimed in 15, further comprising transmitting the sensor data and the azimuth information.

18. (New) The method of calculating an azimuth angle as claimed in 15, further comprising displaying the azimuth information.

19. (New) The method of calculating an azimuth angle as claimed in 15, wherein converting the sensor data further comprises removing a power supply noise and a high-frequency noise.